



# | MAP CONSTRUCTION | VISUAL HIERARCHY AND LAYOUT

Y 2016

Y 2017

Y 2018

Y 2019



NACIS 2017

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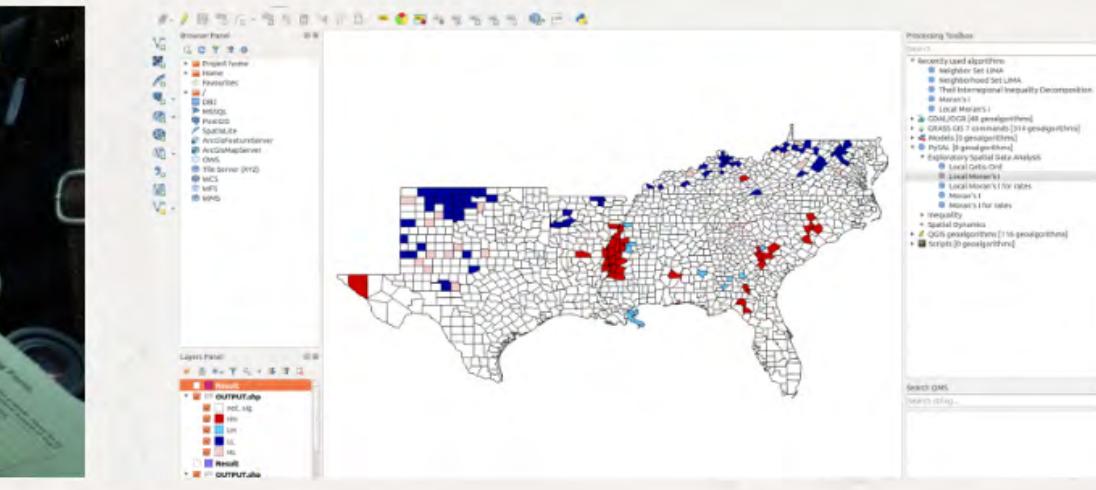
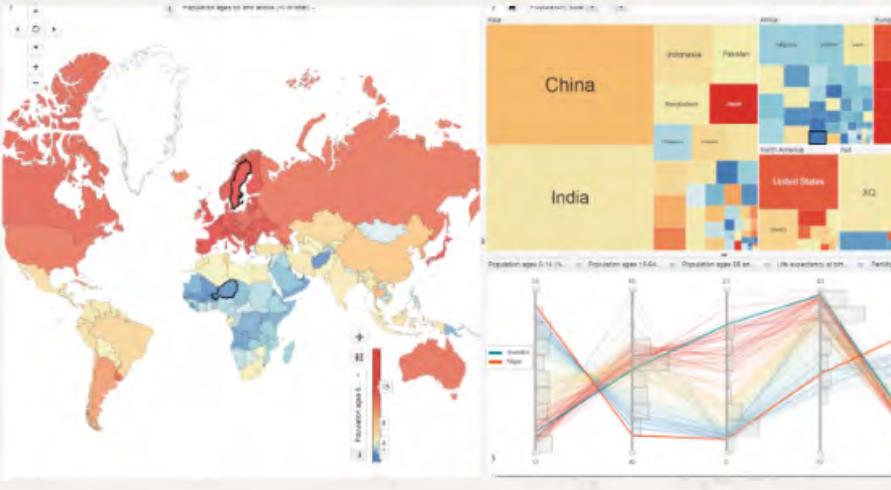
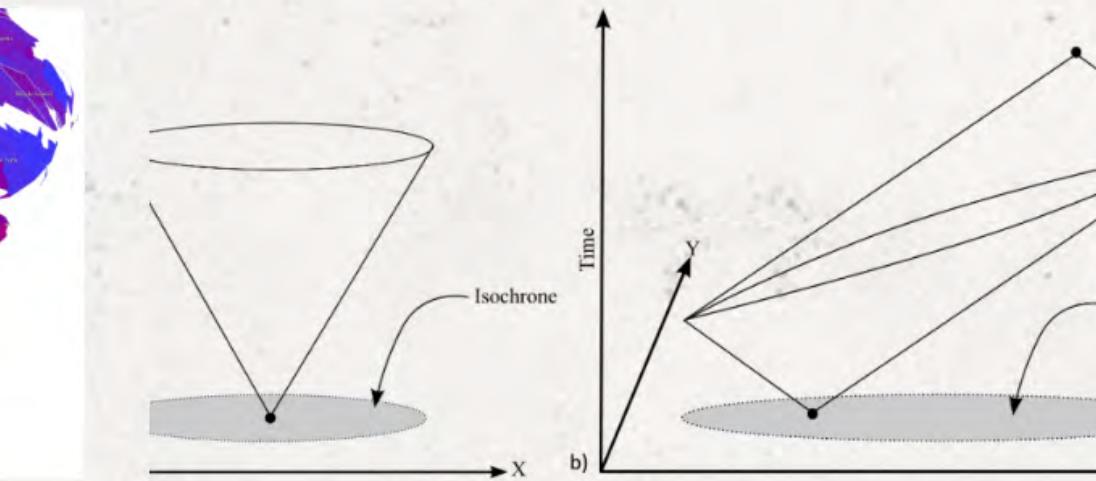
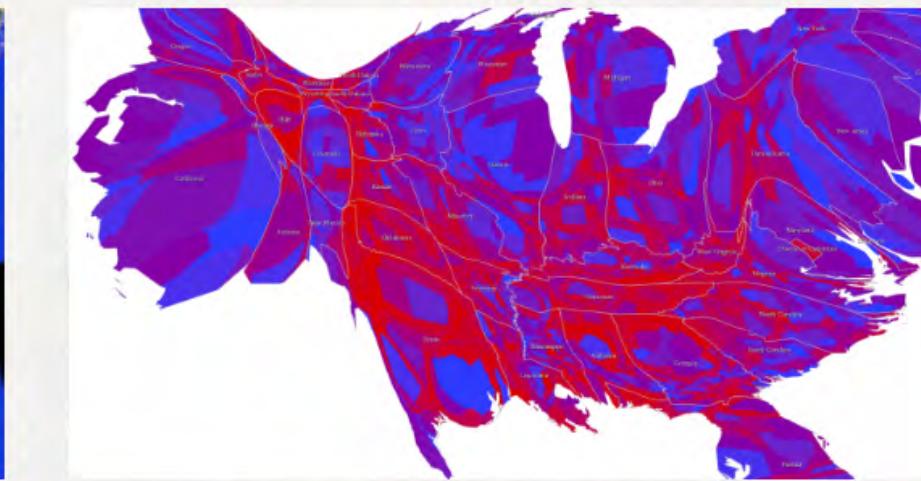
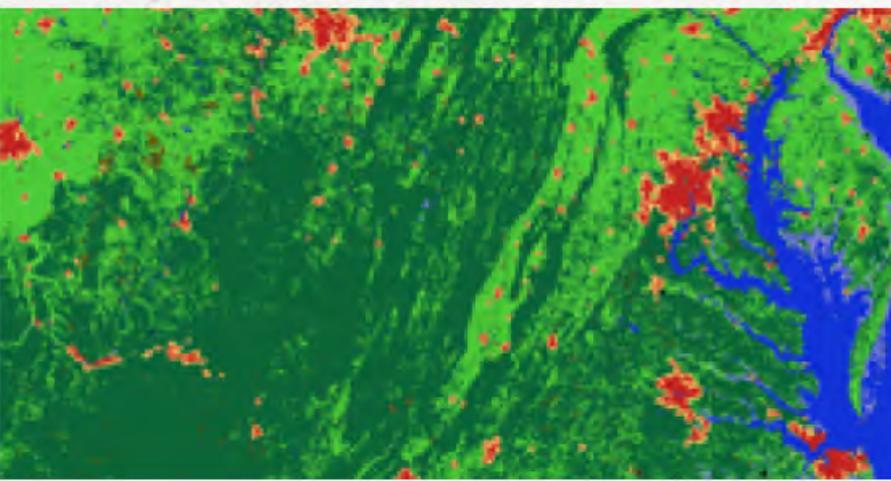
**ABOUT** **TOPICS** **CONTACT US**

**University Consortium for  
GEOGRAPHIC INFORMATION SCIENCE  
GIS&T Body of Knowledge**

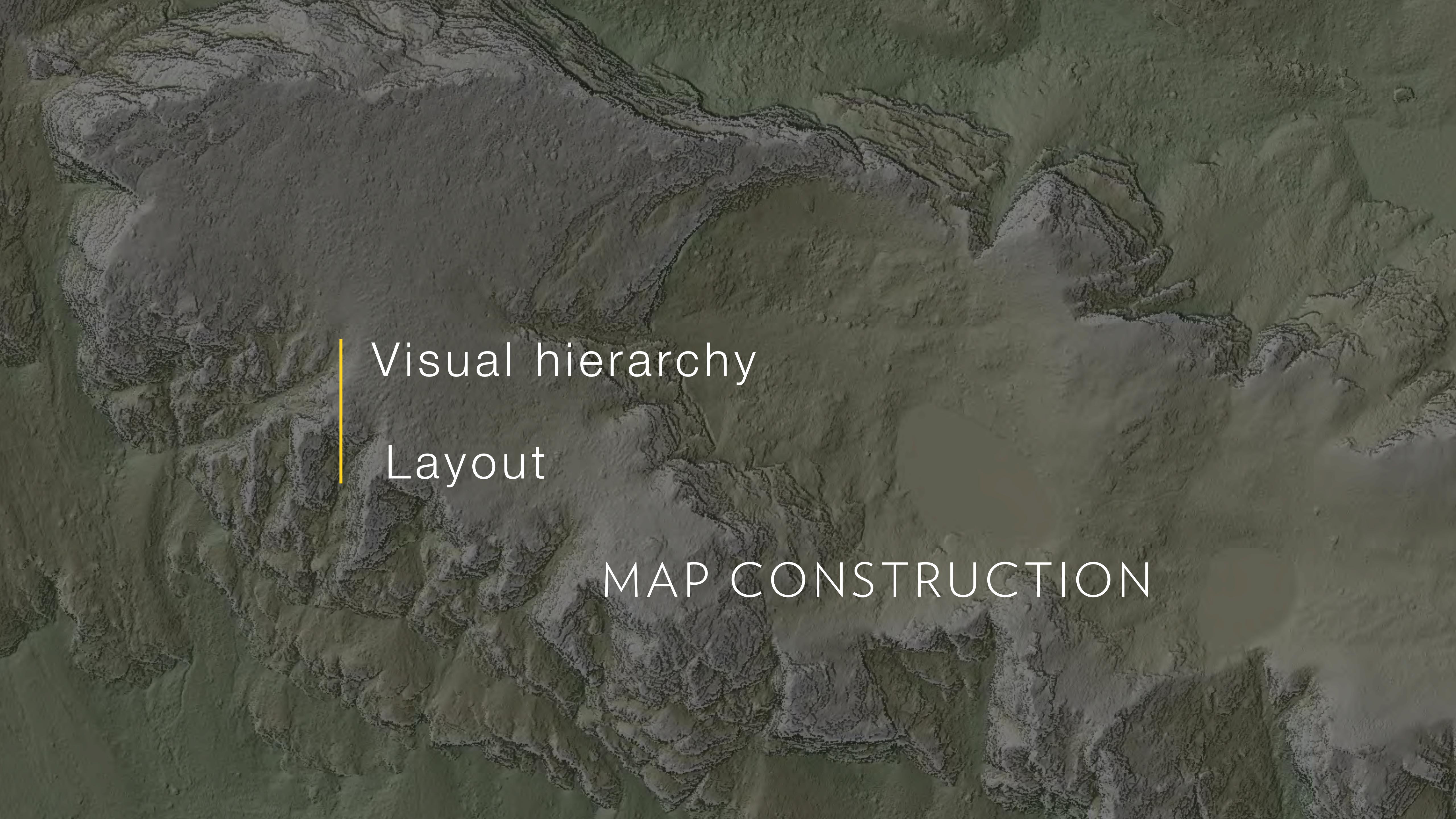
# Welcome to the GIS&T Body of Knowledge!

This Body of Knowledge documents the domain of geographic information science and its associated technologies (GIS&T). By providing this content in a new digital format, UCGIS aims to continue supporting the GIS&T higher education community and its connections with the practitioners.

## Latest Topics



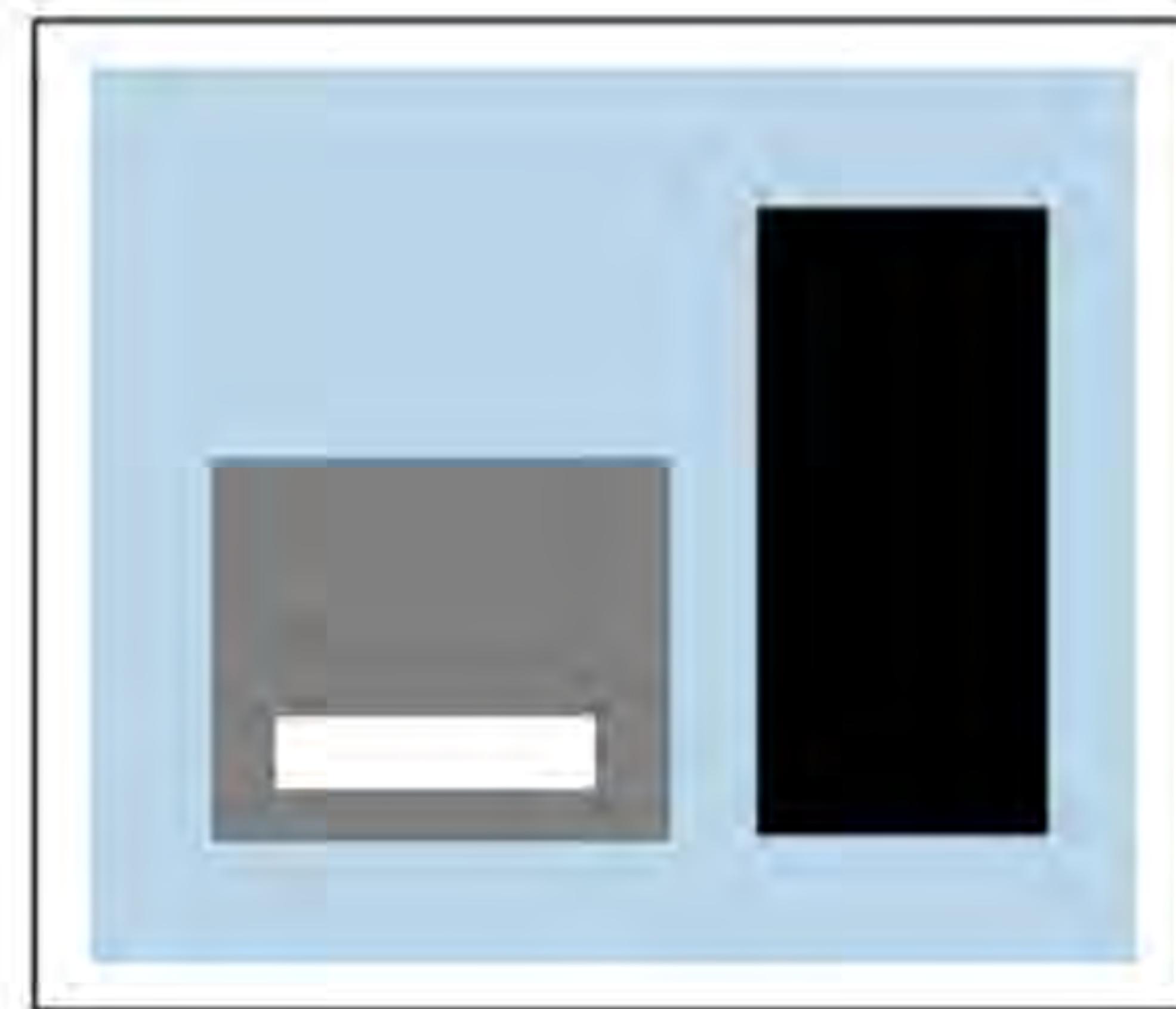


The background image is a grayscale aerial photograph of a landscape featuring a winding river or stream bed. The river is surrounded by a mix of dark, rocky terrain and lighter, agricultural-looking fields. The terrain shows significant texture and variation in color, from deep browns to bright whites.

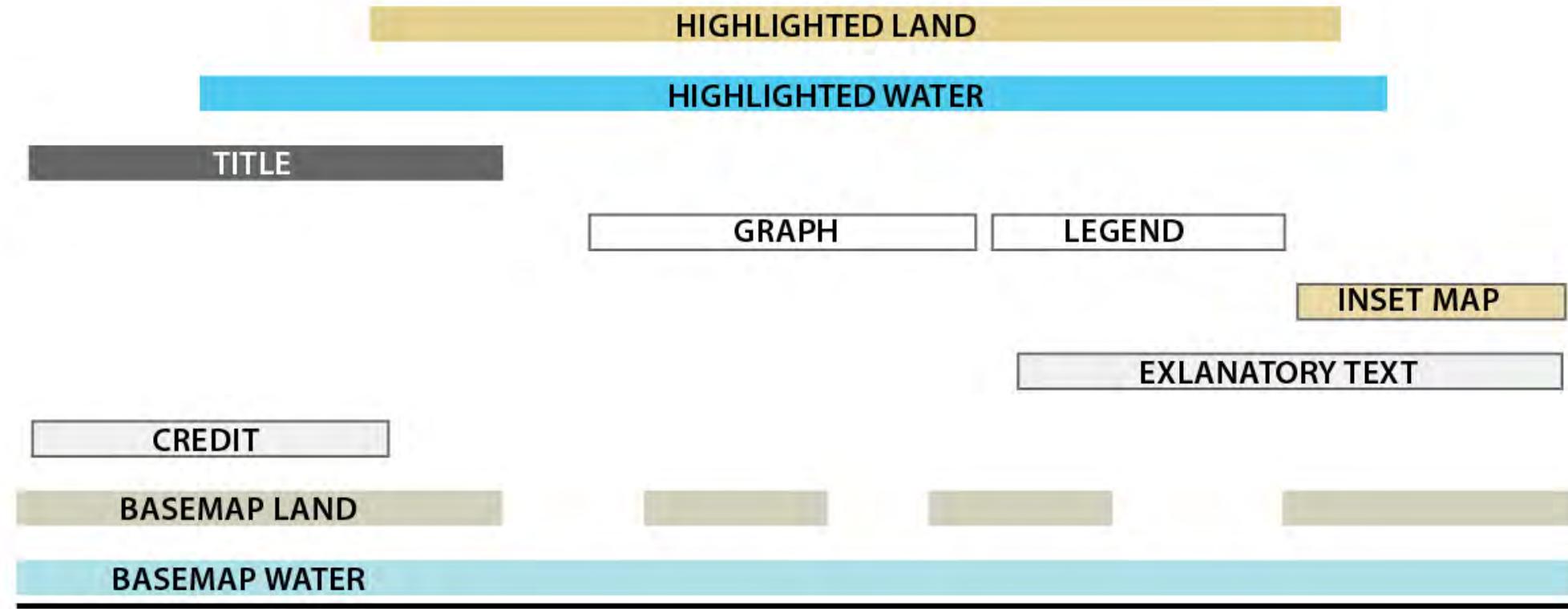
Visual hierarchy

Layout

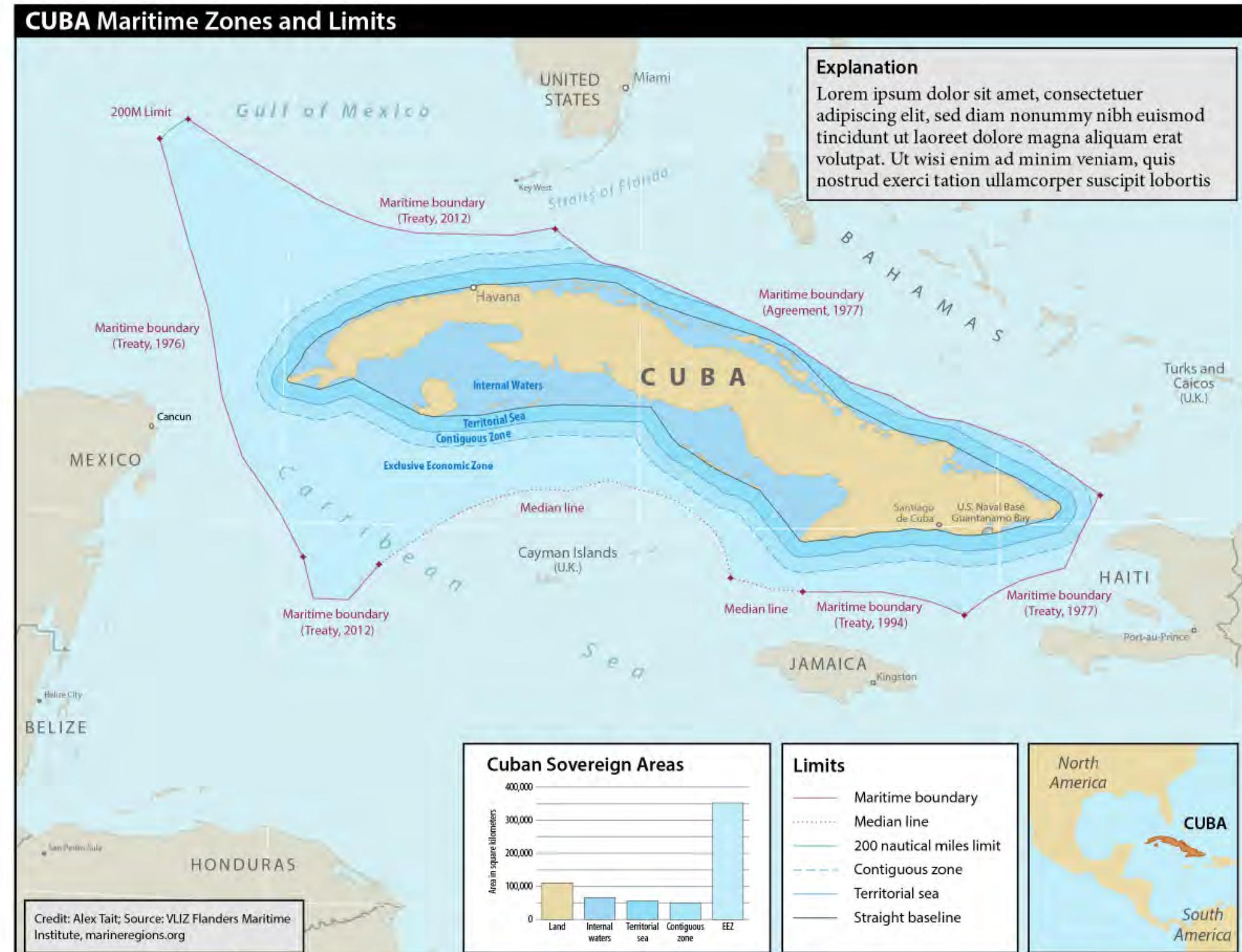
MAP CONSTRUCTION



# Visual Hierarchy



## Map Layout

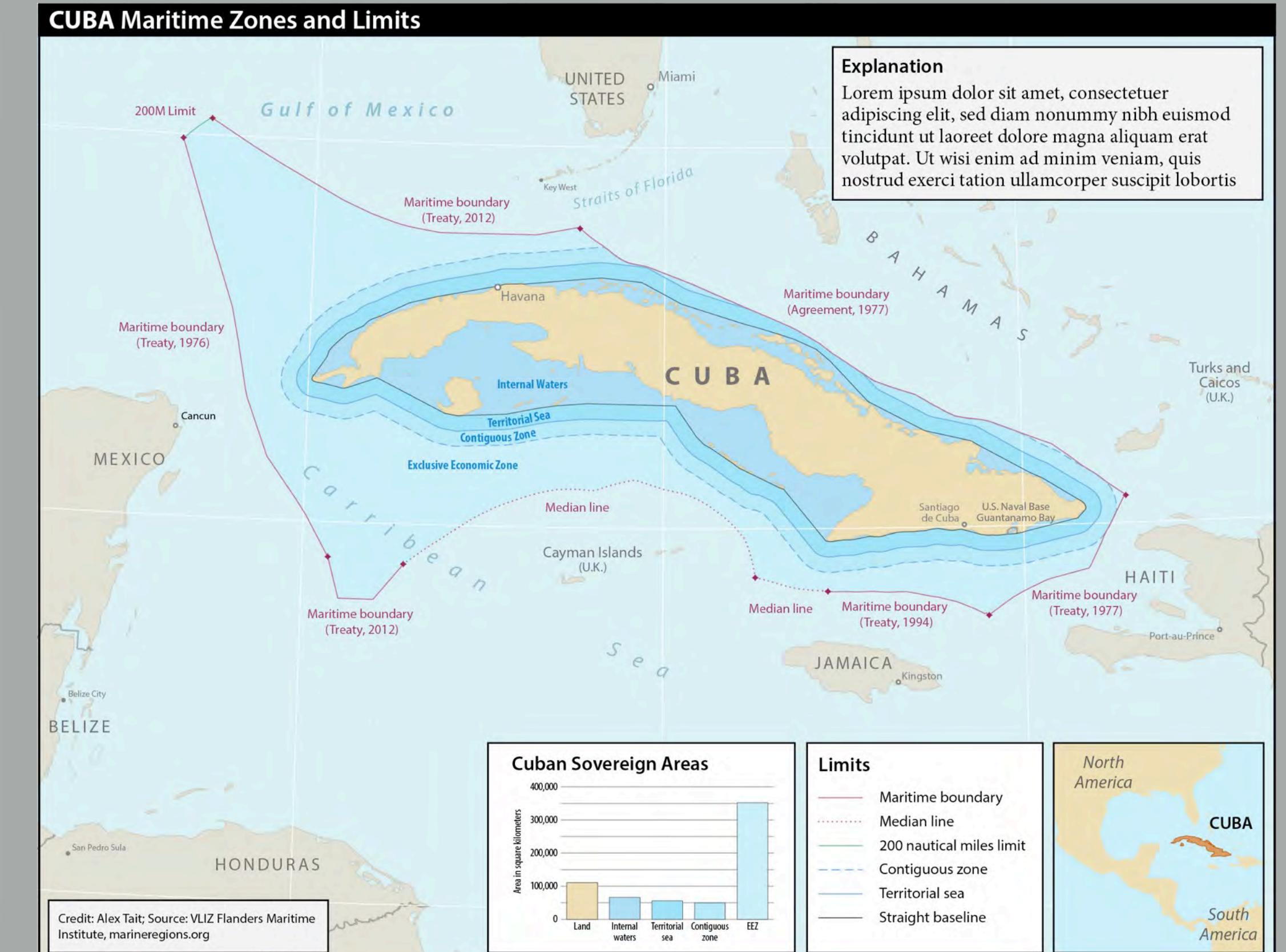


# THE FIELDS OF PLAY FOR MAPPING

## Mapped geography



## Map image



# TOOLS FOR MAP CONSTRUCTION

**Contrast:** method to establish differences in the visual field; stronger area versus weaker; higher area versus lower

**Gestalt:** method to evaluate how a reader groups visual perceptions into broader structures or interpretations

# CONTRAST: LET'S MAKE A DIFFERENCE

Table 1. Types of Contrast

Type	Stronger	versus	Weaker
<b>Size*</b>	Large	vs	Small
<b>Color: Hue</b>	Warm (reds, oranges)	vs	Cool (blues, greens)
<b>Color: Saturation</b>	Intense	vs	Pale
<b>Color: Value*</b>	Dark	vs	Light
<b>Focus</b>	Sharp	vs	Blurry
<b>Position</b>	Center	vs	Periphery
<b>Continuity</b>	Edged	vs	Continuous, smooth
<b>Grouping*</b>	Isolated	vs	Grouped
<b>Arrangement</b>	Ordered	vs	Random
<b>Distribution</b>	Dense	vs	Sparse
<b>Cropping</b>	Entire	vs	Cropped
<b>Detail*</b>	Intricate	vs	Generalized

\*Cartography texts disagree on which is stronger and which weaker



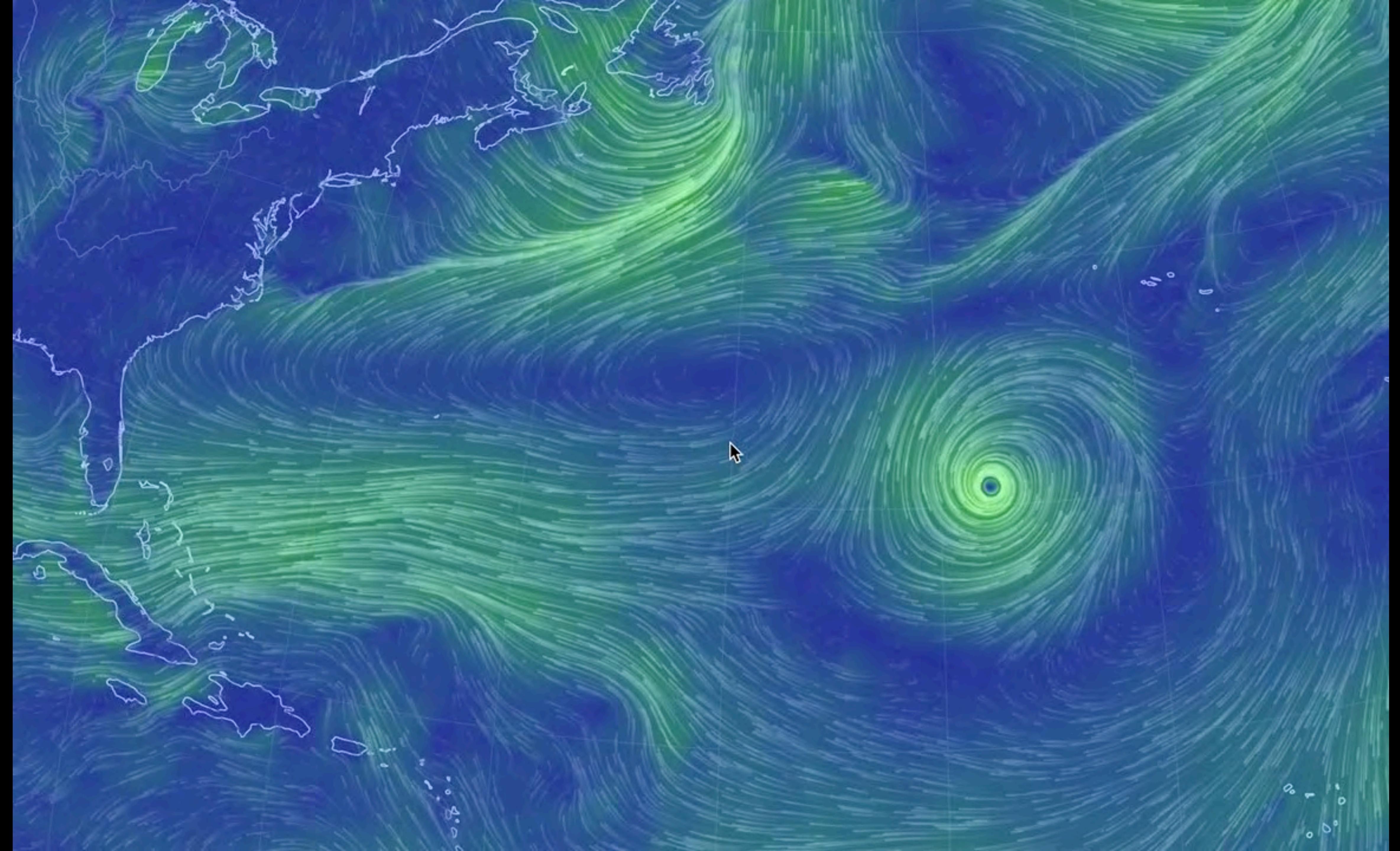


# GESTALT: LET'S GET TOGETHER!

Table 2. Types of Grouping and Gestalt

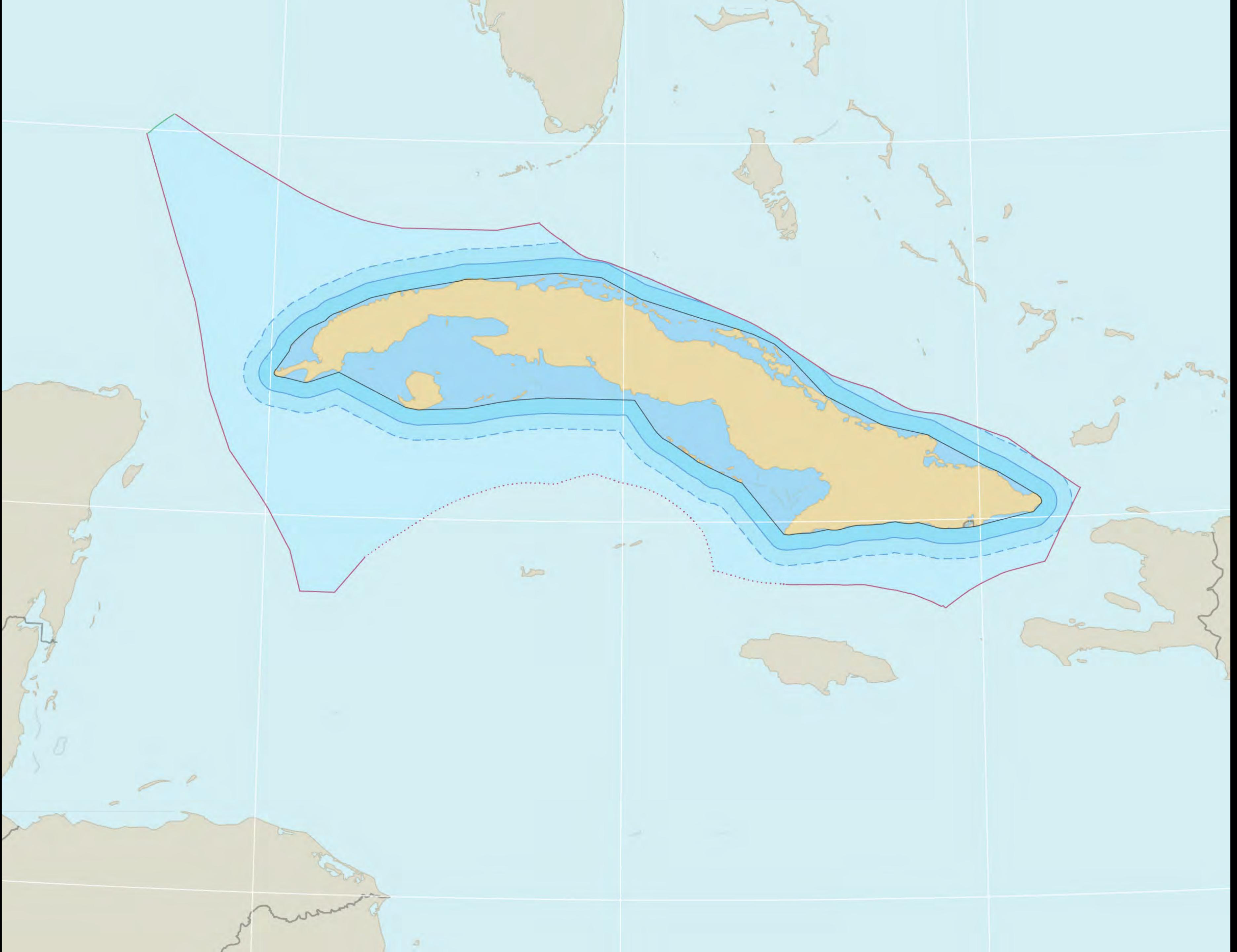
Name	Type	Description
Proximity	Grouping	Objects close to each other group into clusters.
Similarity	Grouping	Objects with similar visual variable characteristics (other than location) form groups.
Direction	Grouping	Objects that flow in similar direction form groups.
Common fate	Grouping	Objects that share the same movement form groups.
Experience or familiarity	Grouping	Familiar shapes or arrangements form groups.
Symmetry	Grouping	Objects that are symmetrical about a line or point form a group.
Stages	Grouping	Complex series of objects group into steps or stages.





# GESTALT: THAT'S YOUR INTERPRETATION

Simplicity	Interpretation	A group of complex objects will form a single, simpler shape
Figure-Ground	Interpretation	Some objects will group and be promoted as figure above a ground (this is the most important gestalt principal for cartography).
Closure	Interpretation	The eye will complete an object's form to create a whole.
Good continuation	Interpretation	The eye will continue the details of an object that is partially hidden from view.



# VISUAL HIERARCHY

# HIERARCHIES

Table 3. Intellectual and visual hierarchies for a static print map (left, after Dent et al, 2009) and for an interactive web map (right, after Muehlenhaus, 2014).

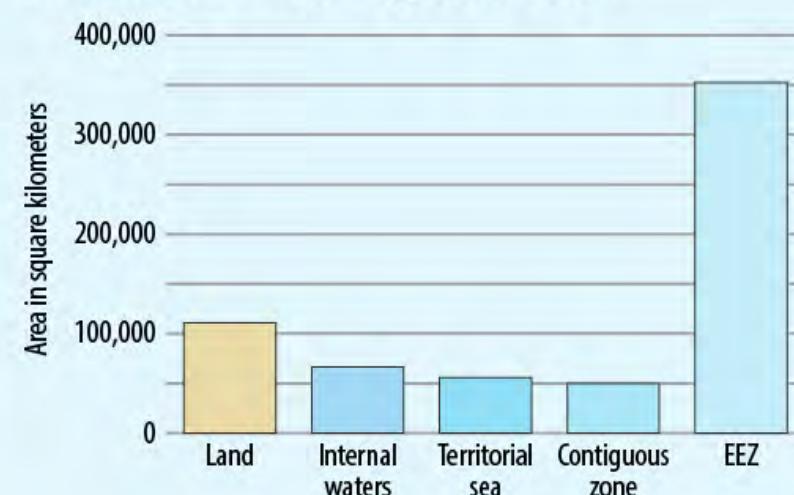
Level	Map Elements
1	Thematic Symbols
2	Title/Legend/Map Symbols/Labels
3	Base Map: land areas, political boundaries, physical features
4	Explanatory Materials: sources, credits
5	Base Map: water features
6	Other Base Map Elements: labels, grids, scales

Level	Map Elements
1	Title/splash screen
2	Map symbology, Key reference data, Info windows (opened)
3	Base Map, Base map labels, Navigation tools
4	Map interactivity, Pan/zoom/selection tools, Print/share features
5	Locator maps, Charts/graphs, Multimedia supplements
6	Supplemental info, Attributions, copyright, Neatlines/grid/graticule, Tool tips

# CUBA Maritime Zones and Limits



## Cuban Sovereign Areas



## Limits

- Maritime boundary
- Median line
- 200 nautical mile limit
- Contiguous zone
- Territorial sea
- Straight baseline

## Explanation

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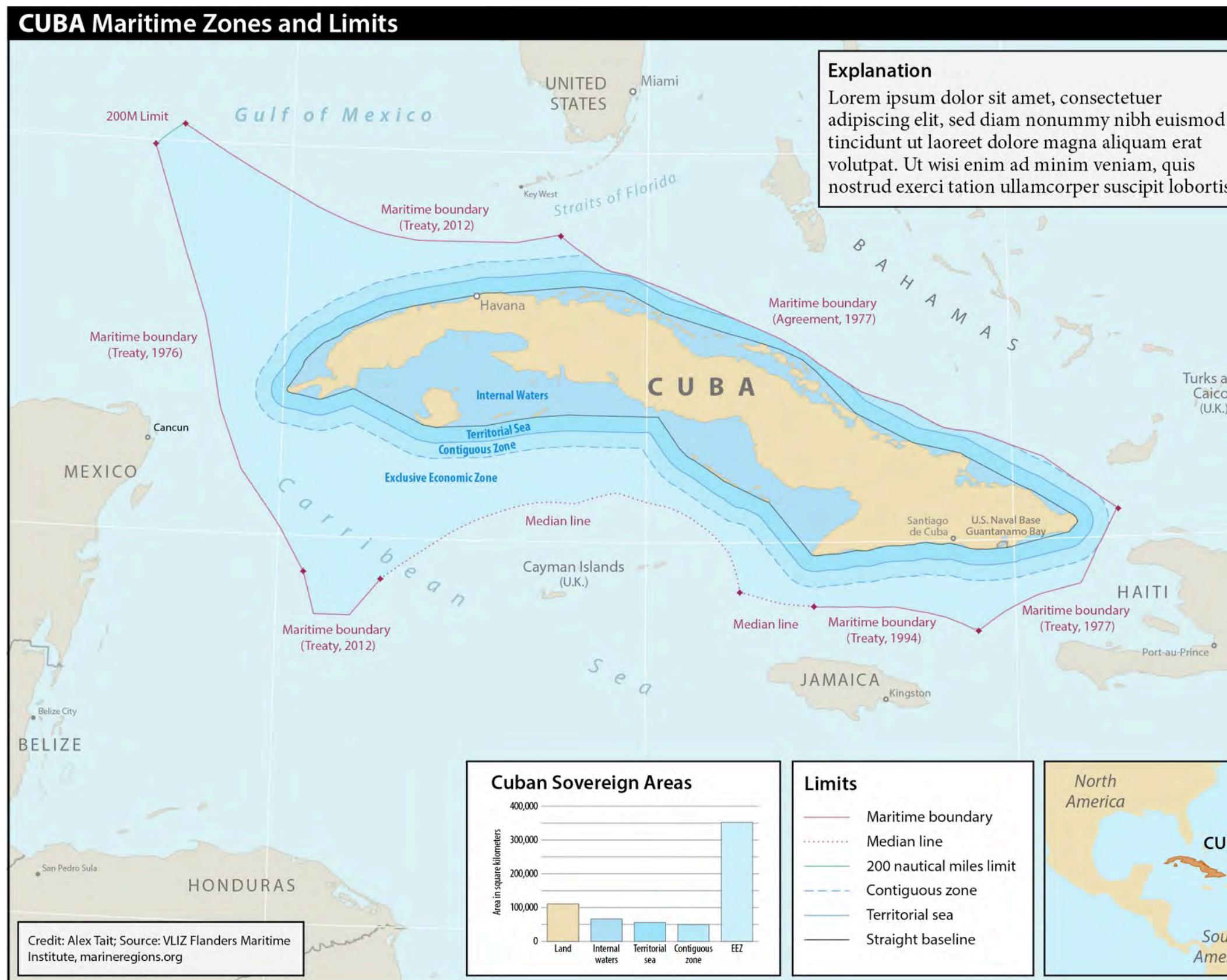
# HIERARCHY: HELPFUL HINTS

- A map's purpose dictates which features are highest in the visual hierarchy (Brewer)
- Color hue, saturation, and value are the easiest means of manipulating contrast and visual hierarchy (Muehlenhaus)
- Use a typeface with a wide range of visual weights (Patterson)
- Take advantage of hiding less important elements behind buttons, drawers, etc. (Muehlenhaus)

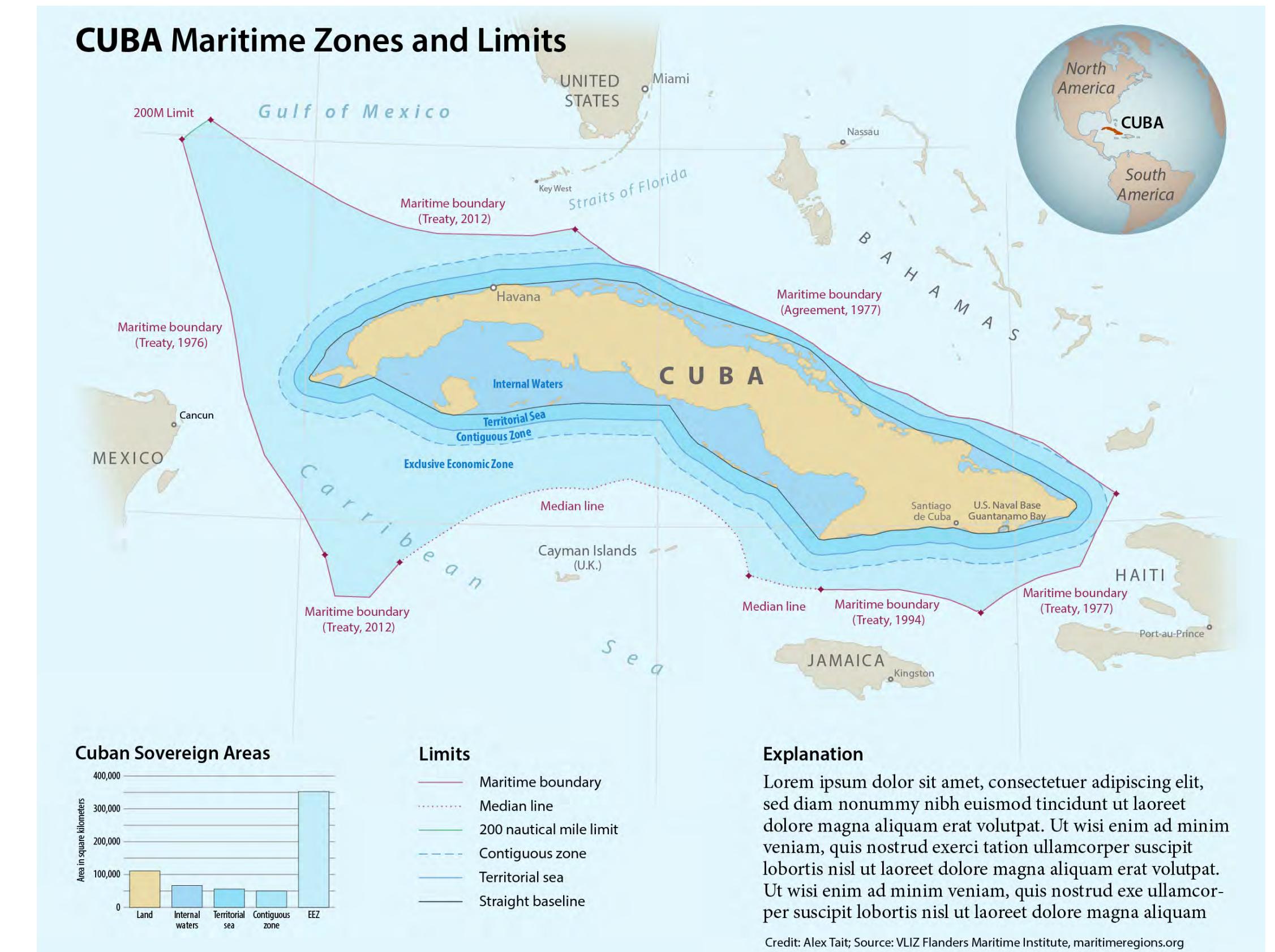
# LAYOUT

# LAYOUT

## Compartmentalized

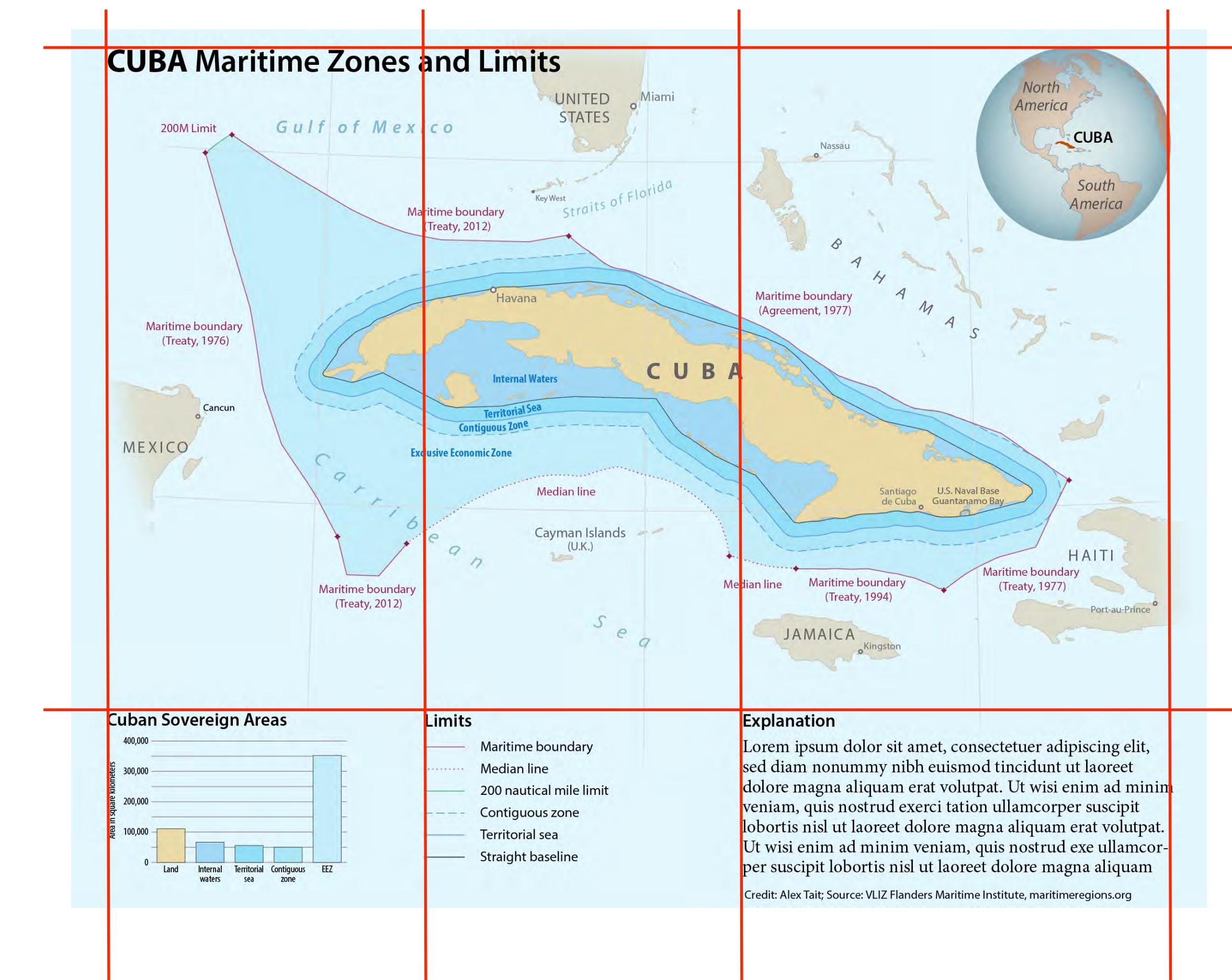
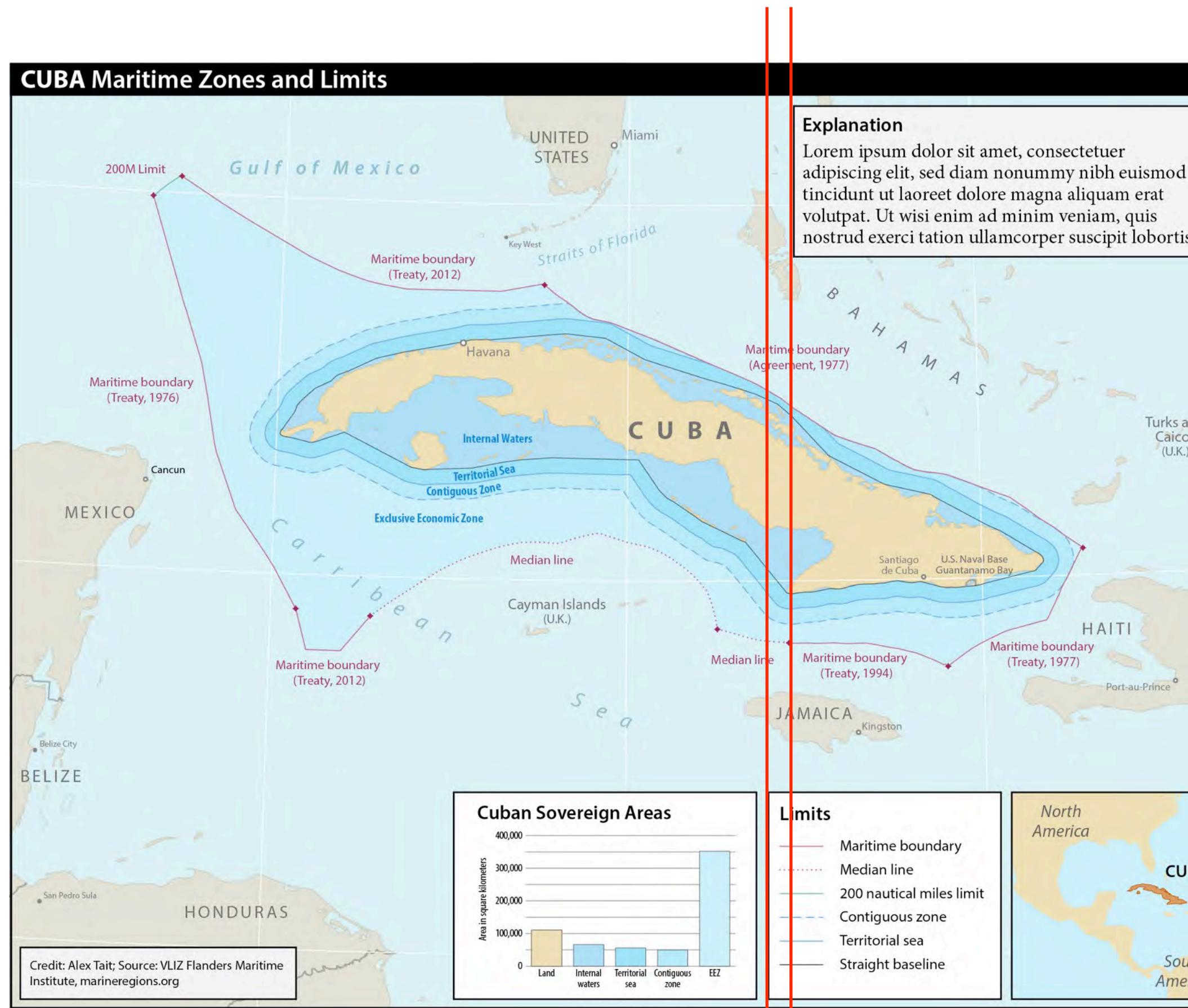


## Fluid

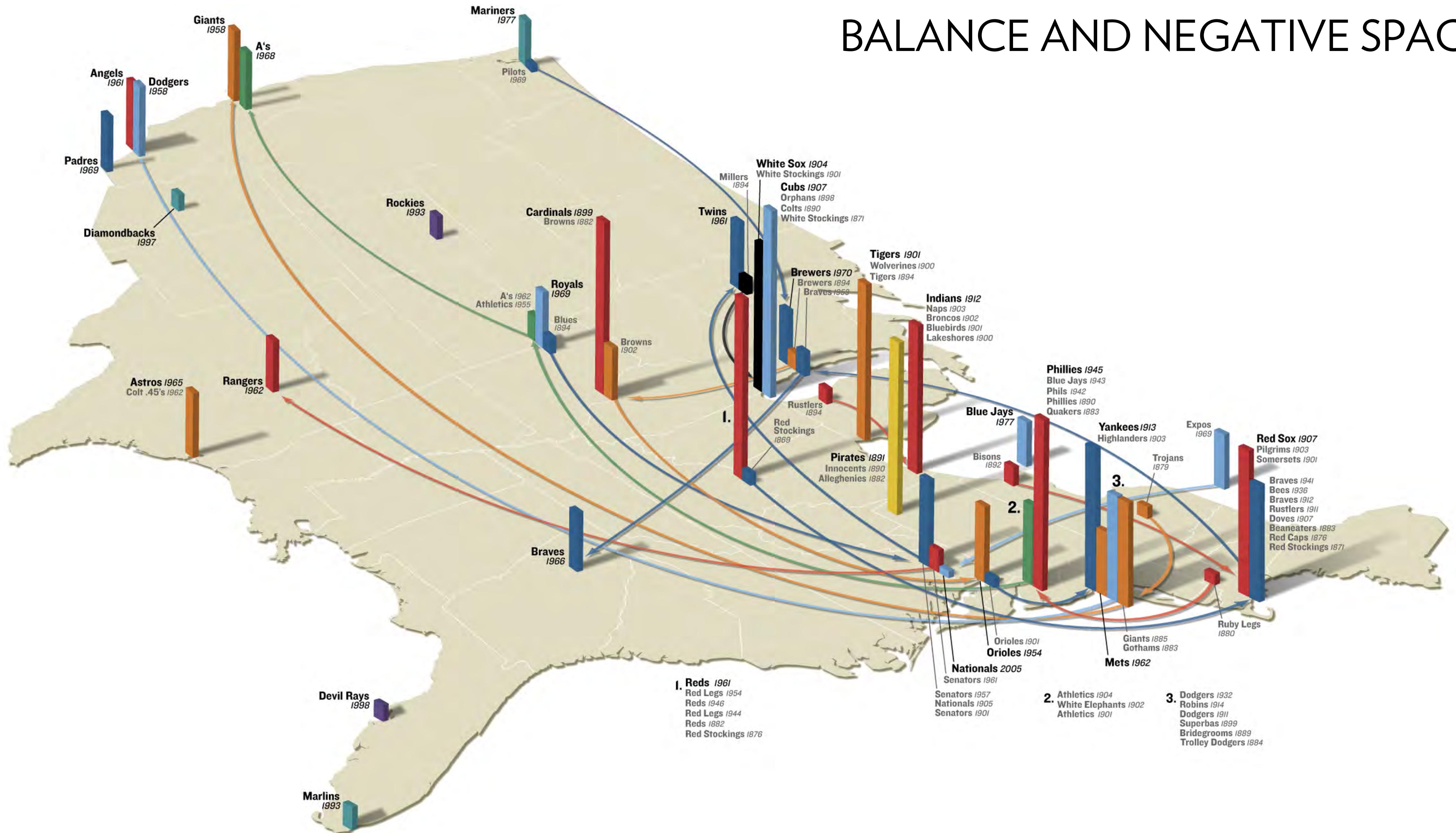


# LAYOUT

## Importance of structure



# BALANCE AND NEGATIVE SPACE

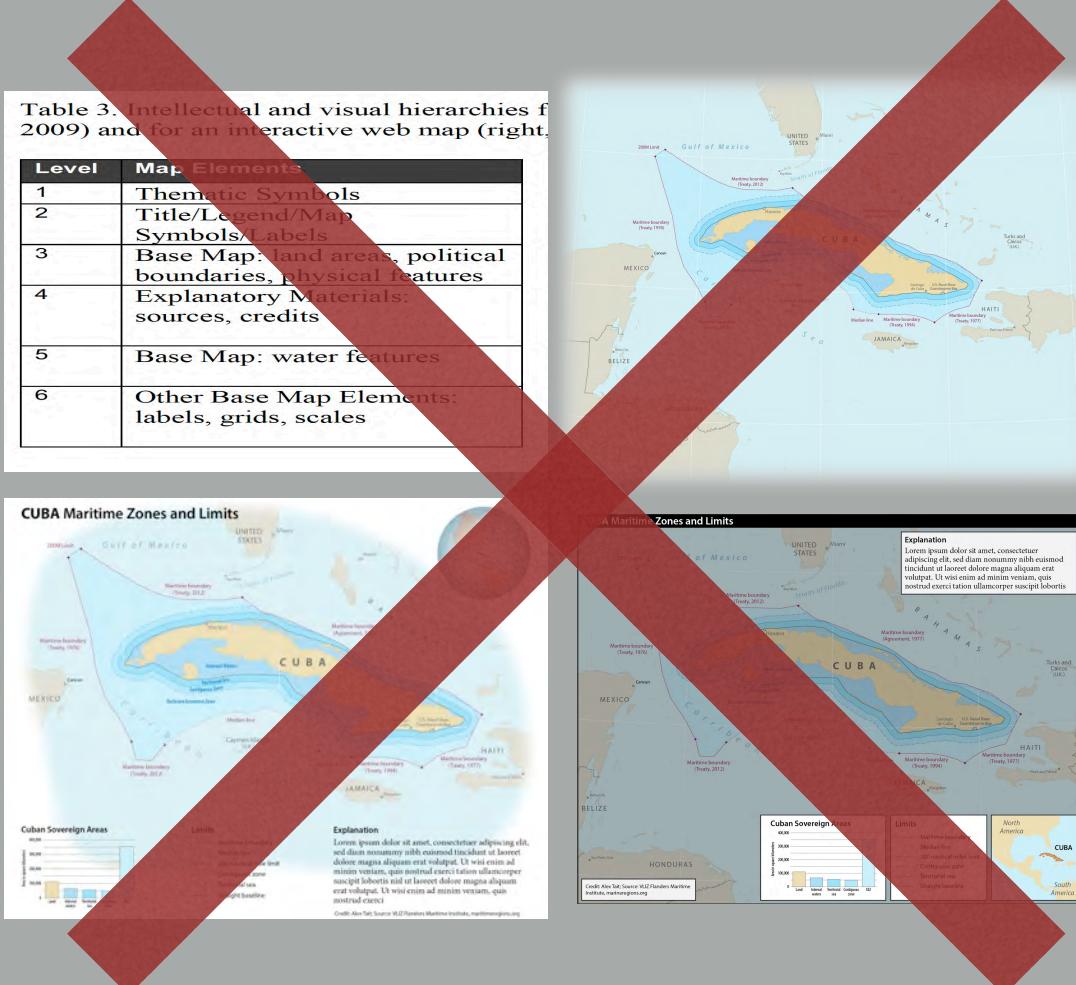


# LAYOUT: HELPFUL TIPS

- Use a construction grid to arrange map elements
- Reduce sight lines among elements in your map layout  
(Krygier and Wood)
- Don't fill all the 'corners and voids' of your map image  
(Brewer)
- Eliminate unnecessary elements; e.g. if you have a graticule you do not need a north arrow!

# MAP CONSTRUCTION FOUR-STEP

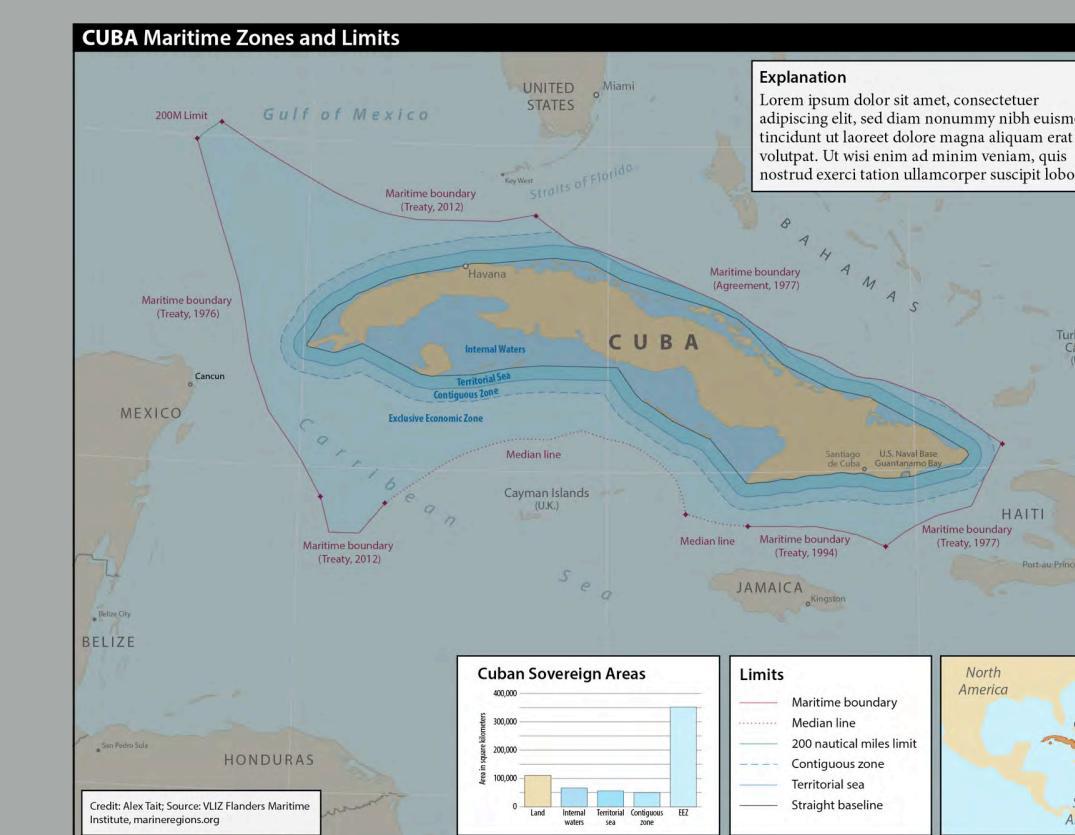
Intellectual hierarchy  
and rough design  
layouts



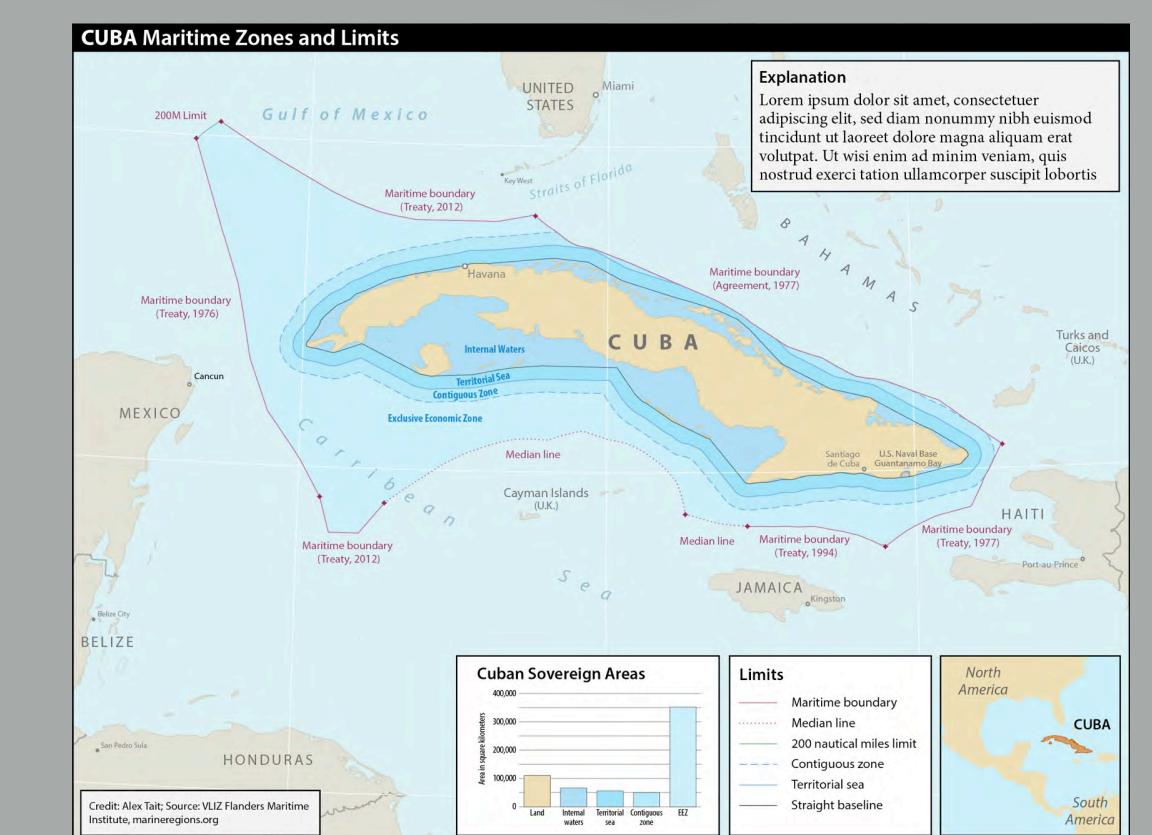
Layout and visual  
hierarchy in mapped  
geography



Layout of all  
elements in map  
image



Hierarchy interplay  
between mapped  
geography & map  
image



# MAP CONSTRUCTION: HELPFUL HINTS

- Don't over-emphasize non-map elements at the expense of the main map symbology
- Place your most important information towards the center of the image (Patterson)
- Make sure that map typography is fully integrated into the construction process
- Avoid visual ambiguity



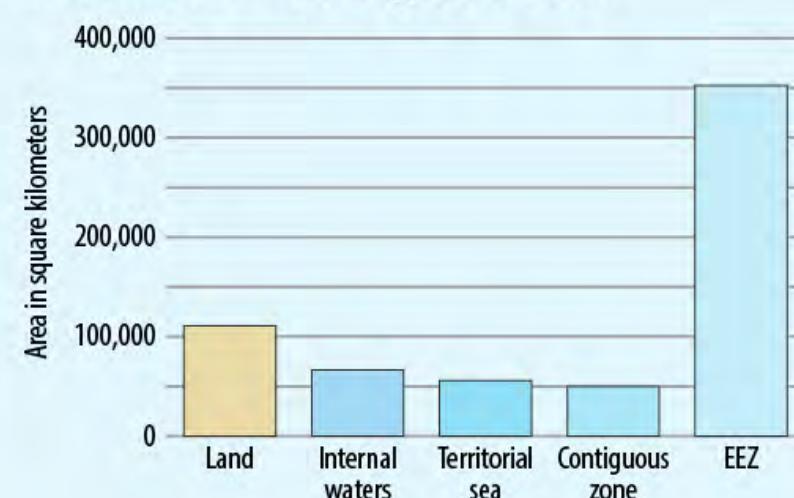
## PARTING THOUGHT

- Squint...

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Brewer, *Designing Better Maps: A Guide for GIS Users*

Krygier & Wood, *Making Maps: A Visual Guide to Map Design for GIS*

Muehlenhaus, *Web Cartography: Map Design for Interactive and Mobile Devices*

Patterson, “Outside the Bubble: Real-world Mapmaking Advice for Students,”  
*Cartographic Perspectives*

THANK YOU

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@taitmaps

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Y 2017

Y 2018

Y 2019



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